APPENDIX E

King County RCU Information

April 29, 2003

Note:

In the event of a discrepancy between this Appendix and the Contract specifications, the specifications shall govern.

**Supplemental Information
King County Department of Transportation
Mobile Data Terminal (MDT) Replacement**

OVERVIEW

The primary objective of this work is to provide the necessary hardware and software to allow the existing Radio Data MDT (Driver Terminal) in the bus to be replaced with a new device (DDU, Driver Display Unit) that allows the driver to be able to use only one terminal for all his data entry.

At the present time, the driver must "LOG ON" to the MDT at the start of his run. In the past, other devices onboard the Bus that could benefit from the information (Route, Run, Operator ID, Etc) entered on the MDT required their own separate LOG ON for each device. This has historically created a situation where the additional LOG ON's did not happen.

Over the past few years, an effort has been under way to provide an On Board System that allows information to be shared between the many electronic devices on the Bus. To date, using a type of interactive NET or LAN (ECHELON LONWORKS), the Radio Computer (MDU), the Automatic Passenger Counter Computer (APC), and the Traffic Control RF TAG (informs the local traffic light which Bus is coming into a particular intersection) have been linked together to share the information entered on the MDT by the driver.

With the progression of technology, and the ever-increasing demand for information that can be accumulated on the Bus, additional devices and systems have been planned for installation on the Bus. There is a need to provide the technology, without increasing the overall operational complexity for the driver. To this end, it is necessary to have only ONE operational interface for the driver (DDU).

The difficulty with creating this device, and the interface or NET that ties the onboard systems together, has been the lack of agreement by all of the product suppliers and Transit properties as to which standard would be used. At the present time, the Federal Government requires that if federal funds are used the J1708 interface protocol be used. The J1708 protocol was developed long enough ago that technology has marched beyond the scope of its capabilities and product suppliers have not been consistent in their implementation of the protocol. In order to insure that the future of Seattle Metro's On Board Systems can be integrated, and work properly, it is necessary for them to take an active roll in the integration of the On Board devices.

This work was intended to provide Metro with the Hardware and software to maintain their control over the On board Systems. It provides Metro with:

1. The necessary Hardware and Software interfaces between the existing devices that now communicate via the Echelon Lonworks Net and new devices.

2. The required J1708 interface for the Driver Display Unit.

3. Input to insure that Metro is able to procure a DDU that will communicate properly with the other devices and Nets.

4. The interfaces (both temporary and long term) to support the Smart Card Project.

PHASE I - DESCRIPTION

In order to replace the MDT with a new DDU, it is necessary to split the existing functionality of the MDT into two parts:

1. The existing MDT provides the Driver OPERATIONAL INTERFACE. This consists of LOG ON, placing and receiving calls on the radio system, setting audio levels, turning on the PA, ETC.

2. The existing MDT provides all of the ANALOG HARDWARE interfaces between the Mobile Data Unit (MDU), the Two Way Radio, the PA, microphones, ETC.

To accomplish the replacement, a new prototype Hardware device was created. This unit is called the Radio Control Unit (RCU). This device is connected to the MDU by the same cable that now connects to the existing MDT. The RCU was designed to provide all of the necessary ANALOG HARDWARE interfaces that the existing MDT now provides.

During the course of development, an additional requirement for the RCU became apparent. In order to provide an interface that allows Metro to procure a New Driver Display Unit (DDU) in the Smart Card Project that will be compatible with the future On Board Systems, there was a need for the RCU to provide a J1708 interface for the DDU. The RCU hardware and software were designed to provide this interface during the interim period of time when the Smart Card System is on the bus, and the future Vehicle Logic Unit (onboard computer that controls all Onboard Systems and provides data transfer, data storage, a gateway between J1708 and Lonworks Net, ETC.) has not been installed. This interface now performs all of the OPERATIONAL INTERFACE that was provided by the MDT.

In the course of developing the J1708 interface for the DDU, valuable information was acquired on the difficulties involved in procuring a DDU that was advertised as being J1708 compatible, and then integrating it into the system. This information was provided to Metro to assist them in their DDU procurement.

PHASE II - DESCRIPTION

Phase II's primary objective is add OPERATIONAL INTERFACE capability to the Lonworks NET. Phase II provides for the development of the required software for the MDU, VLU and the Lonworks NET to allow communication between the MDU and the DDU via the VLU. This capability will be used by the VLU (Onboard Computer) to provide a J1708 interface to the DDU when the VLU is implemented (the DDU moves from the RCU to the On Board J1708 bus in the final Bus configuration).

In the process of developing the VLU interface, the information acquired on the hardware and software required for the VLU will be documented and provided to Metro to assist them in the procurement of VLU's.